

Attachment No. 1

Specifications

SPECIFICATIONS

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SPECIFICATIONS

DIVISION 1--GENERAL REQUIREMENTS

SECTION 1.1--GENERAL

1.1.1. The Requirement

It is required that there be constructed and completed, in accordance with the contract provisions and clauses, these specifications, and the drawings listed in paragraph 5.1.2. (List of Drawings) hereof, Replacing Metal Stairways and Drain Covers with Fiberglass Reinforced Plastic (FRP), Boulder Canyon Project, Hoover Dam, Arizona-Nevada.

The work is located at Hoover Dam, on the Colorado River, approximately 7 miles via U.S. Highway 93, northeast of Boulder City, Nevada, in Clark County, Nevada and Mohave County, Arizona.

The area of construction is inside of Hoover Dam in the drainage (or abutment) galleries and shafts, between elevations 975.00 and 674.00.

1.1.2. Description of the Work

The principal components of the work to be performed under these specifications include the following:

a. Removing the following items:

- (1) Approximately 490 feet of steel inclined stairways.
- (2) Approximately 250 feet of steel drain covers.

b. Furnishing and installing the following items:

- (1) Approximately 490 feet of fiberglass reinforced plastic (FRP) inclined stairways.
- (2) Approximately 250 feet of FRP drain covers.

1.1.3. Sequence of Construction

a. Construction Schedule.--The Contractor shall submit a construction schedule to the Contracting Officer within 15 days following the receipt of notice to proceed. The schedule shall show the beginning and completion dates for each portion of the construction. The Contractor shall update the schedule on a monthly basis or more often if significant changes are anticipated.

b. Sequence of Construction.--The Contractor shall sequence construction operations to allow continuous accessibility to the upper and lower drainage galleries from either the Arizona or Nevada sides of the dam. Sequencing of construction operations shall be in accordance with Paragraph 2.1.2. (Work Sequence). The sequence of construction shall be subject to the approval of the Contracting Officer and shall be approved prior to commencing work.

1.1.4. Submittal Requirements

a. General.--The Contractor shall furnish all materials and perform all work required for furnishing submittals to the Government, in accordance with the clause 52.236-21 entitled "Specifications and Drawings for Construction, this paragraph, Table 1A (List of Submittals), and the requirements in the provisions, clauses, and paragraphs of this contract.

The word "submittals" shall be interpreted to include drawings, data, manuals, certifications, test reports, curves, samples, color chips or charts, brochures, and other items furnished by the Contractor for approval, informational, or other purposes.

b. List of submittals.--Table 1A (List of Submittals) lists the submittals required by this contract except those submittals which are required conditionally, required by entities other than the Bureau of Reclamation, or which are periodic in nature. Any submittal required to be submitted by the Contractor, but which is not listed in the table, shall be submitted in accordance with the applicable requirements of this contract. In case of a conflict between the requirements of this paragraph and the requirements included elsewhere in this contract, the requirements elsewhere shall take precedence over the requirements contained in this paragraph.

c. Submittals.--Each item in table 1A (List of Submittals) has been assigned an RSN (Required Submittal Number). The "Submittals required" column of the table specifies the material to be submitted for each RSN. All of the material specified for an RSN will be considered a complete set; and where the material required for an RSN is specified as separate or distinguishable parts, a complete set shall include all parts. Only complete sets shall be submitted.

The number of complete sets to be submitted, and the location to which they are to be sent, shall be in accordance with the "No. of sets to be sent to:" column of the table, except as provided below for sets of original material.

When an RSN involves submittal of original (non-copied) material, all original material, or as much thereof as is necessary to form a complete set, shall be included in just one complete set. This "originals" set shall be sent to the proper address, given in subparagraph e. below, as determined by the "Responsible code" column of the table and the following:

- (1) CO indicates Contracting Officer.
- (2) CE indicates Construction Engineer.

The "originals" set shall be counted as one of the complete sets required to be submitted under the "No. of sets to be sent to:" column of the table.

For each RSN, the Contractor shall submit complete sets of required submittal material under the cover of a transmittal letter. At the Contractor's option, complete sets for more than one RSN may be submitted under cover of the same transmittal letter, provided they have the same responsible code designation as shown in the table. The Contractor's transmittal letter shall include:

- (1) Reference to Bureau of Reclamation contract number and title.
- (2) Identification of responsible code as shown in the table.
- (3) Complete list of RSN(s) for which material is being submitted.
- (4) For each RSN, number of complete sets and list of materials included.
- (5) For each RSN, identification of the submittal as an initial submittal or a resubmittal.

Each drawing submitted by the Contractor shall have the Contractor's or supplier's title and drawing number on it. Drawings and data shall be labeled with the Bureau of Reclamation contract number and the schedule item number.

Manufacturer's data for commercial products or equipment, such as catalog cut sheets, shall be clearly marked to indicate the item(s) to be furnished. The data shall be sufficiently comprehensive to identify the manufacturer's name, type, model, size, and characteristics of the product or equipment, as well as to fully demonstrate that the product or equipment meets the requirements of these specifications.

Sample and color selection submittals shall include complete manufacturer's product and color identification. Samples shall be representative of the product to be installed. A "set" of samples shall include the type and quantity of materials specified in the referenced paragraph. Color chips shall be sample paint representations; ink color reproductions will not be acceptable. Each sample, sample kit, set of color chips, or color chart shall be labeled with the Bureau of Reclamation contract number and title.

Submittals requiring certification by a registered professional shall be signed and sealed.

d. Review of submittals furnished for approval.--The time required for review of each submittal or resubmittal furnished under an RSN for approval will not begin until the Government receives complete sets of all the submittal materials required for that particular RSN. The number of calendar days required for review of drawings or data submitted or resubmitted for approval will include the date the drawings or data are received by the Government, and will extend through the date of return mailing to the Contractor.

Except as otherwise provided in the specifications for specific submittals, the Government will require 30 calendar days for review of each submittal or resubmittal furnished by the Contractor for approval, and this review time will apply to each separate submittal or resubmittal whether the submittals are approved, not approved, or returned for revision.

If the Government uses time in excess of the specified number of calendar days for review of any submittal or resubmittal, additional time, not to exceed the excess time, will be added to the time allowed the Contractor for completion of the work affected by such excess time, to the extent it is demonstrated that the excess time caused delay. If the Government's

review of two or more separate submittals or resubmittals is late and results in concurrent days of excess time, such days will be counted only once in computing an extension of the completion date. Further, if the Contractor fails to make complete approval submittals in the sequence and within the time periods specified in this contract, and thus precludes the Government from approving or considering for approval such submittals within the specified calendar day period, then the Contractor shall not be entitled to an extension of time allowed for completion of the work.

Unless otherwise specified, one set of the submittals required for approval will be returned to the Contractor either approved, not approved, or conditionally approved, and will be marked to indicate changes, if required. Submittals that are not approved or that require changes or revisions shall be revised and resubmitted for approval, and shall show changes and revisions with revision data. All requirements specified for the initial submittal shall apply to any resubmittals required. Unless otherwise specified, all submittals which are to be resubmitted shall be resubmitted by the Contractor within 30 calendar days after the Contractor has received the Government's comments.

e. Addresses.--The Contractor shall send the submittals to the applicable addresses listed below as required by table 1A (List of Submittals).

The Contractor shall also send a copy of the transmittal letter to each of the addresses listed below that are not sent the submittal.

Submittals shall be sent as required by Table 1A (List of Submittals) to:

(1) Contracting Officer, Bureau of Reclamation, Attention: LC-3113,
P.O. Box 61470, Boulder City NV 89006-1470

(2) Construction Engineer, Bureau of Reclamation, Attention LC-2000,
P.O. Box 60400, Boulder City NV 89006-0400

f. Cost.--Unless otherwise specified, no separate payment will be made for preparing and furnishing submittals to the Government, and the cost thereof shall be included in the prices offered in the schedule for the applicable items of work requiring the submittals or other items of work.

Table 1A - List of Submittals

RSN	Item	Reference paragraph or clause	Responsible code	Submittals required	No. of sets to be mailed to:*		Due date or delivery time
					CO	CE	
C1	Bonds	52.228-15	CO	Performance and payment bonds	2	0	Within 15 calendar days after contract award.
C2	Construction schedule	52.236-15					
	(1) Practicable schedule		CE	(1) Blackline prints	1	4	Within 15 calendar days after receipt of notice of award
	(2) Progress chart (bar chart)						
C3	Safety data	WBR 1452.223-900	CO	Experience Modification Rate for Worker's Compensation Insurance; Log and Summary of Occupational Injuries and Illnesses; death and lost workday severity incidence rate.	1	0	Within 20 calendar days from the date of receipt of notice of award
C4	Insurance - Work on a Government installation	52.228-5	CO	Written proof that the required insurance has been obtained	1	0	Before commencing work under this contract.
C5	Liability insurance	DOI 1452.228-70	CO	Acceptable evidence showing that insurance has been obtained	1	0	Before commencing work under this contract
C6	Accident prevention	52.236-13	CO	Accident exposure data	1	0	As prescribed by the Contracting Officer
C7	Payment (Electronic Funds Transfer)	52.232-28	CO	Payment information	1	0	After award, but not later than 14 days prior to submission of the first invoice
C8	Release of claims	DOI 1452.204-70	CO	Release of claims (DI-137) against United States	1	0	After completion of work and prior to final payment
C9	Equal opportunity	52.222-26	CO	Information required by Executive Order 11246 (SF 100)	1	0	Within 30 days following the award

RSN	Item	Reference paragraph or clause	Responsible code	Submittals required	No. of sets to be mailed to:*		Due date or delivery time
					CO	CE	
C10	Subcontracts (Labor standards data)	52.222-11	CE	(1) List of subcontractors (2) Statement and Acknowledgment Form (SF-1413)	1	1	Within 14 days after award of contract and within 14 days after award of any subcontract
C11	Safety	WBR 1452.223-81	CE	Proposed safety program	0	4	Prior to beginning any onsite work. See section 2 of Reclamation Safety and Health Standards.
C12	Hazardous materials	52.223-3 1.4.2	CE	List of hazardous material (LHM) and Material Safety Data Sheets (MSDS)	0	2	Not less than 45 days prior to jobsite delivery
C13	Inclined stairways	3.1.1	CE	a. Material data	0	4	30 days prior to shipment or procurement
				b. FRP Safety Gates shop drawings	0	4	Prior to fabrication or procurement
				c. "As-built" drawings	0	1	30 days after completion of installation
C14	Drain covers	3.2.1	CE	a. Material data	0	4	30 days prior to shipment or procurement
				b. Certified test reports	0	4	30 days prior to shipment
				c. "As-built" drawings	0	1	30 days after completion of installation

SECTION 1.2--MATERIALS

1.2.1. Materials to be Furnished by the Contractor

a. General.--The Contractor shall furnish all materials required for completion of the work.

The words "material" or "materials" as used in these specifications to denote items furnished by the Contractor shall be construed to mean equipment, machinery, product, component, or any other item required to be incorporated in the work.

When a separate item which includes the furnishing of any material is provided in the schedule, the cost of furnishing, hauling, storing, and

handling shall be included in the price offered for that item. When a separate item is not provided in the schedule for furnishing any material required to be furnished by the Contractor, the cost of furnishing, hauling, storing, and handling shall be included in the price offered for the work for which the material is required.

Materials furnished by the Contractor shall be of the type and quality described in these specifications. The Contractor shall make diligent effort to procure the specified materials from any and all sources, but where because of Government priorities or other causes, materials required by these specifications become unavailable, substitute materials may be used: Provided, That no substitute materials shall be used without prior written approval of the Contracting Officer, said written approval to state the amount of the adjustment, if any, to be made in favor of the Government. The Contracting Officer's determination as to whether substitution shall be permitted and as to what substitute materials may be used shall be final and conclusive. If the substitute materials approved are of less value to the Government or involve less cost to the Contractor than the materials specified, an adjustment shall be made in favor of the Government, and where the amount involved or the importance of the substitution warrants, a deductive modification to the contract will be issued. No payments in excess of prices offered in the schedule will be made because of substitution of one material for another or because of the use of one alternate material in place of another.

b. Inspection of materials.--Materials furnished by the Contractor which will become a part of the completed construction work shall be subject to inspection in accordance with clause 52.236-5 entitled "Materials and Workmanship" and clause 52.246-12 entitled "Inspection of Construction" at any one or more of the following locations, as determined by the Contracting Officer: at the place of production or manufacture, at the shipping point, or at the site of the work. To allow sufficient time to provide for inspection, the Contractor shall submit to the Contracting Officer, at the time of issuance, copies in triplicate of purchase orders, including drawings and other pertinent information, covering materials on which inspection will be made as advised by the Contracting Officer, or shall submit other evidence in the event such purchase orders are issued verbally or by letter.

The inspection of materials at any of the locations specified above or the waiving of the inspection thereof shall not be construed as being conclusive as to whether the materials and equipment conform to the contract requirements under clause 52.246-12 entitled "Inspection of Construction," nor shall the Contractor be relieved thereby of the responsibility for furnishing materials meeting the requirements of these specifications. Acceptance of all materials will be made only at the site of the work.

1.2.2. Materials and Workmanship - Reclamation

a. Materials.--In accordance with clause 52.236-5 entitled "Material and Workmanship," all materials furnished by the Contractor shall be new and of the most suitable grade for the purpose intended considering strength, ductility, durability, and best engineering practice.

Except as specified, materials shall conform to Federal specifications or standards, or, if there are no applicable Federal specifications or standards, materials shall conform to the specifications or standards of ANSI (American National Standards Institute), ASTM (American Society for Testing and Materials), ASME (American Society of Mechanical Engineers), SAE (Society of Automotive Engineers), IEEE (Institute of Electrical and Electronic Engineers), NFPA (National Fire Protection Association), or other nationally recognized standards organization. If the Contractor proposes to deviate from, or to use materials not covered by, the aforementioned specifications and standards, the Contractor shall submit, for approval, the justification for and exact nature of the deviation, and complete specifications for the materials proposed for use.

Parts shall be made accurately to standard gauge where possible. Threads, including but not limited to those of bolts, nuts, screws, taps, pipes, and pipefittings shall be unified screw threads conforming to ANSI B1.1 or B1.20.1. For internal connections only, the Contractor will be permitted to deviate from the ANSI standards, provided the Contractor furnishes a complete set of taps and dies as might be required to facilitate repair or replacement.

All fasteners shall be permanently marked with a symbol identifying the manufacturer and with symbol(s) indicating grade, class, type, and other identifying marks in accordance with reference or applicable standards.

b. Workmanship.--The Contractor shall be responsible for the accurate manufacture and fabrication of materials in accordance with best modern practice and the requirements of these specifications, notwithstanding minor errors or omissions therein.

Liberal factors of safety and adequate shock-absorbing features shall be used throughout designs, especially for parts subjected to variable stress or shock, including alternating or vibrating stress or shock. Shock-absorbing features and parts subject to vibration shall include provisions which prevent components from loosening.

1.2.3. Reference Specifications and Standards

Materials, Contractor design, construction work, and other requirements which are specified by reference to Federal Specifications, Federal Standards, or other standard specifications or codes shall be in compliance with the editions or revisions listed in WBR 1452.211-81, "Effective Dates of Referenced Specifications and Standards." If a more recent specification or standard is found to be in effect other than that which is listed in WBR 1452.211-81, the Contractor shall notify the Contracting Officer. In the event of conflicting requirements between a referenced specification, standard, or code and these specifications, these specifications shall govern.

Unless otherwise specified, all materials that will become a part of the completed work shall be new and shall conform to the Federal or other specifications and standards referred to herein. Where reference specifications numbers are designated throughout these specifications, they refer to Federal Specifications unless otherwise noted. In the event that the materials are not covered by Federal or other specifications, the materials furnished shall be of standard commercial quality. Where types, grades, or

other options offered in the reference specifications are not specified in these specifications, the material furnished will be acceptable if it is in accordance with any one of the types, grades, or options offered.

Single copies of Federal specifications and standards may be obtained without charge from any one of the General Services Administration Business Service Centers. See the provision in clause 52.211-1 entitled "Availability of Specifications Listed in the GSA Index of Federal Specifications, Standards and Commercial Item Descriptions, FPMR Part 101-29."

Bureau of Reclamation Specifications and Standards may be obtained from the Bureau of Reclamation, Attention: D-8170, PO Box 25007, Denver CO 80225. This address may also be used to order the various manuals and standard specifications printed, reprinted, or published while the Bureau of Reclamation was officially named the Water and Power Resources Service. All references to Water and Power Resources Service or any form derivative thereof shall be considered synonymous with the Bureau of Reclamation.

Addresses for obtaining some industrial and governmental (other than Federal and Bureau of Reclamation specifications and standards) specifications, standards, and codes are listed in clause 52.211-3 entitled "Availability of Specifications Not Listed in the GSA Index of Federal Specifications, Standards and Commercial Item Descriptions."

The Contractor shall maintain onsite, a copy of all specifications, standards, codes, manuals, and other documents that are referenced in these specifications and that are pertinent to the materials being installed or work proceeding at that time. These shall be available for use by the Contracting Officer and the Contracting Officer's representatives.

In accordance with clause 52.236-5 entitled "Material and Workmanship," the references to materials, wherein manufacturer's products or brands are specified by "brand name or equal" purchase descriptions, are made as standards of comparison only as to type, design, character, or quality of the article required, and do not restrict offerors or the Contractor to the manufacturer's products or to the specific brands named. It shall be the responsibility of the Contractor to prove equality of materials and products to those referenced and to provide all descriptive information, test results, and other evidence as may be necessary to prove the equality of materials or products which the Contractor offers as being equal to those referenced.

SECTION 1.3--LOCAL CONDITIONS

1.3.1. Investigation of Site Conditions

The galleries and shafts are confined spaces and are in a wet environment due to the constant flow of water in the drains.

The galleries and shafts above elevation 674.00 have limited existing lighting and ventilation.

It is recommended that a visit to the site of the work be made prior to bid preparation in order to perform investigations as to the existing conditions affecting the work to be done under this contract. If the Contractor chooses not to visit the site or conduct investigations he will nevertheless be

charged with knowledge of conditions which reasonable inspection and investigations would have disclosed.

The Contractor shall assume all responsibility for deductions and conclusions as to the difficulties in performing the work.

1.3.2. Access to the Work and Haul Routes

a. General.--Contractor access to the drainage galleries and shafts inside of Hoover Dam shall be via the stairways, service hatch openings, and the two elevators. Use of the elevators is recommended for gaining access to the work site and for removing/moving material. The load capacity of each elevator is 5000 pounds.

The contractor will be required to coordinate work activities with operations at Hoover Dam. These operations include, but are not limited to, plant and dam maintenance, other contractors who may be working in the area, and public tours. Public tour hours are from 8:30 a.m. until 5:45 p.m. every day.

The Contractor shall make his own investigation of the condition of available public or private roads and of clearances, restrictions, bridge-load limits, bond requirements, and other limitations that affect or may affect transportation and ingress and egress at the jobsites. Subject to clause 52.249-10 entitled "Default (Fixed-Price Construction)," the unavailability of transportation facilities or limitations thereon shall not become a basis for claims for damages or extension of time for completion of work. It shall be the Contractor's responsibility to construct and maintain, at his own expense and at his own risk, any haul roads, access roads, bridges, or drainage structures required for construction operations.

The contractor shall submit for approval a work plan which outlines his method for accessing the site and work areas. The plan shall include transporting employees and materials to the worksite.

b. Existing roads.--Existing roads are available for the Contractor's use subject to existing restrictions. The Contractor shall meet all conditions properly imposed upon the use of existing roads by those having jurisdiction thereover, including (without limitation of the generality of the foregoing) seasonal or other limitations or restrictions, the payment of excess size and weight fees, and the posting of bonds conditioned upon repair of road damage caused by the Contractor.

c. Haul routes.--The hauling of construction materials or waste materials over public highways, roads, or bridges shall be in compliance with the applicable local regulations and shall be such as to minimize interference with or congestion of local traffic. Where haul routes cross public highways or roads, the Contractor shall provide barricades, flagmen, and other necessary precautions for safety of the public as provided in paragraph 1.4.1. (Safety of the Public).

d. Parking.--Parking is extremely limited at Hoover Dam. The Contractor shall not block traffic with parked vehicles, equipment, and/or materials.

The Contractor's employee parking will be provided at an area near the Government warehouse as approved by the Contracting Officer.

The Contractor will be restricted to three (3) vehicles in the powerhouse area at any one time. The types of vehicles that may be parked in this area will be subject to the approval of the Contracting Officer. The Contractor shall place an identification label, with the Contractor's name, on the windshield of vehicles parked in the powerplant area. This will not be required if the Contractor's name is prominently displayed at some other location on the vehicle.

e. Cost.--The cost of all work described in this paragraph shall be included in the prices offered in the schedule for other items of work.

1.3.3. Security and Identification of Employees

The operation of Hoover Dam and Powerplant requires continuous and effective security measures. Such security is carried out by a Federal guard system, and the security regulations provide for controlled access to certain restricted areas including the switchyards, powerplant, and other critical areas. These restricted areas are designated by and may be modified or changed by the Government. The Contractor shall be responsible for initiating necessary measures to ensure that its employees comply with all established security rules and regulations, including, but not restricted to, the following:

(1) Construction work areas.--All areas where work is required under this contract are designated as construction work areas. The Contracting Officer will designate suitable accessways to construction work areas for use of construction personnel. Unless specifically authorized, construction personnel shall be restricted to these areas. It shall be the Contractor's responsibility to ensure, by appropriate and effective means, that its personnel remain in these areas while on the jobsite.

(2) Restricted areas.--Construction personnel shall not be permitted to enter established or designated restricted areas unless so authorized by the Contracting Officer. Such entry shall be in accordance with, and subject to, the security regulations established for the area. It shall be the Contractor's responsibility to ensure, by appropriate and effective means, that its personnel shall not enter these areas unless authorized as herein specified.

(3) Identification of Contractor employees.--Should Contractor personnel require access into secured areas, these personnel will be issued numbered identification badges clearly identifying the employee and its employer. Identification will include photographs. Such identification shall be required for all employees on the jobsite and badges shall be worn at all times in plain sight. Badges will be furnished by the Government.

Initial issuance of badges will be made at no cost to the Contractor; however, the cost of replacement badges shall be borne by the Contractor. All badges must be returned to the Contracting Officer upon completion of the work.

1.3.4. Use of Land for Construction Purposes

a. General.--The Contractor will be permitted to use Government land, controlled by the Bureau of Reclamation, for field offices, construction plants and buildings, storage yards, shops, roads, spoil areas, and other construction facilities required for construction purposes.

The storage yard available to the Contractor is located within the area that is referred to as the Central Warehouse. Storage space within this yard is limited and the Contractor should expect to be sharing use of this yard with other contractors and government employees. No enclosed storage is available and the Contractor will be responsible for the protection of all materials stored at the Warehouse yard. The ambient temperature range that might be encountered at the yard may range from 10 degrees F. to 130 degrees F.

If private land is used for construction facilities, or other construction purposes, the Contractor shall make all necessary arrangements and shall pay all rental and other costs associated therewith.

b. Government land.--The Contractor's use of Government land for construction purposes shall be subject to the applicable requirements of the contract clauses, SECTION 1.5--ENVIRONMENTAL QUALITY PROTECTION of these specifications, and to the requirements of this paragraph. Such use shall not interfere with any part of the work under this contract, nor with the work of other contractors or the Government in the vicinity, nor with reservations made, or as may be made, by the Government for the use of such land.

The Contractor's construction facilities shall be arranged and operated in a manner to preserve and protect existing features, trees, and vegetation to the maximum extent practicable. The location, construction, operation, maintenance, and removal of construction facilities on Government land shall be subject to the approval of the Contracting Officer.

Upon completion of the work, and following removal of construction facilities and required cleanup, Government land used for construction purposes and not required for the completed installation shall be regraded.

c. Cost.--No charge will be made to the Contractor for the use of Government land for construction purposes. All work required by this paragraph shall be at the expense of the Contractor.

1.3.5. Protection of Existing Installations

a. General.--In performing work in the vicinity of, and in the construction work areas, the Contractor shall take all necessary precautions to safeguard existing installations which are to remain in place. The Contractor shall obtain the location of embedded conduit, pipe, cable and other embedded items before performing any drilling or cutting of concrete and shall protect adjacent installations during his construction operations.

The Contractor shall furnish, install and maintain adequate protection as needed to safeguard personnel and existing facilities from harm due to his operations. Such protection shall be subject to approval of the Contracting Officer.

The Contractor shall not introduce any foreign material or debris into the drains and shall provide protective coverings over the drains during construction operations.

All protective installations shall be arranged so as to permit operation of the existing equipment and facilities by the Government while work under these specifications is in progress. The Contractor shall sequence construction operations to allow continuous accessibility to the upper and lower drainage galleries from either the Arizona or Nevada sides of the dam. Sequencing of construction operations shall be in accordance with Paragraph 2.1.2. (Work Sequence).

The Contractor shall remove all protective installations provided by him after they have served their purpose. The materials furnished by the Contractor to provide protection shall remain the property of the Contractor.

Additionally, the Contractor shall provide protective covering such as mats, pads, and plywood in the elevators and access galleries when transporting material. The protective covering shall be removed at the end of each work shift.

The Contractor shall be responsible for and shall repair, at his expense, any damage to existing installations due to the Contractor's operations or his failure to provide proper protection; or at the option of the Contracting Officer, any such damage may be repaired by the Government, and the Contractor will be backcharged for the cost thereof.

The cost of all protection, as described in these specifications, including furnishing all necessary materials, shall be included in the prices offered in the schedule for other items of work.

1.3.6. Government-Furnished Facilities

The following facilities will be available to the Contractor at no charge for use in the performance of work under these specifications:

- a. Water at approximately 80 pounds per square inch pressure.
- b. Sanitary facilities - existing restrooms will be made available.
- c. Electrical power--single phase, 115 volt; three phase, 460 volt.
- d. Air at 85 to 90 pounds per square inch pressure.

The location of these facilities will be shown during the site visit or after award of the contract. Facilities are provided on an as-is, where-found basis.

The Contractor shall provide all necessary distribution circuits, transformers, and other electrical equipment required for distributing electrical power to the place or places of use by the Contractor and shall dismantle and remove from the site of the work all such distribution circuits and equipment at the termination of the contract.

Likewise, the Contractor shall provide all means of conveying water and air to points of use and shall remove from the site all Contractor equipment at the termination of the contract.

The cost of providing necessary materials and labor for conveying water, power and air to points of use shall be included in the prices offered in the schedule for other items of work.

SECTION 1.4--SAFETY

1.4.1. Safety of the Public

The Contractor shall provide, erect, and maintain all necessary barricades, suitable and sufficient flasher lights, flagmen, danger signals, and signs, and shall take all necessary precautions for the protection of the work and the safety of the public.

Specific signs, barricades, and flagmen requirements are detailed in sections 9 and 19 of the Bureau of Reclamation's publication "Reclamation Safety and Health Standards" and the American National Standards Institute "Manual on Uniform Traffic Control Devices for Streets and Highways" (ANSI D6.1).

Tours are conducted daily at Hoover Dam in areas other than the construction work area and should not interfere with construction operations. However, if a tour is encountered while gaining ingress or egress to or from the construction area, the Contractor shall stop and wait for the tour to pass. Tour routes will be adjusted where possible to bypass the construction area.

The cost of complying with this paragraph shall be included in the prices offered in the schedule for other items of work.

1.4.2. Safety and Health Requirements

a. The Contractor shall not require any laborer or mechanic employed in the performance of the contract to work under conditions which are unsanitary, hazardous, or dangerous to the laborer's or mechanic's health or safety, as determined under Construction Safety and Health Standards promulgated by the Secretary of Labor under section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 327 et seq.), as amended, and "Reclamation Safety and Health Standards," published by the Bureau of Reclamation.

b. The Contractor shall fully comply with Reclamation's "Reclamation Safety and Health Standards" and amendments or revisions thereto in effect on the date bids are received. Copies are available from the Contracting Officer for \$29 each at the following address:

Bureau of Reclamation
Lower Colorado Regional Office
Attention: LC-3113
P.O. Box 61470
Boulder City NV 89006-1470
Tel: (702) 293-8524

Construction Safety and Health Standards promulgated by the Secretary of Labor may be obtained from any regional or area office of the Occupational Safety and Health Administration of the U.S. Department of Labor.

c. The Contractor shall submit in writing a proposed safety program in the form and time intervals prescribed in section 2 of the "Reclamation Safety and Health Standards."

d. The Contractor is responsible for being cognizant of and ensuring compliance with the requirements set forth in subparagraphs a. and b. above. Such responsibility shall apply to both the Contractor's operations and those of the Contractor's subcontractors. When violations of the safety and health requirements contained in these specifications or standards referenced in subparagraph a. are called to the Contractor's attention by the Contracting Officer or the Contracting Officer's authorized representatives, the Contractor shall immediately correct the condition to which attention has been directed. Such notice either oral or written, when served on the Contractor or the Contractor's representative(s), shall be deemed sufficient.

e. In the event the Contractor fails or refuses to promptly comply with the compliance directive issued under subparagraph d. above, the Contracting Officer or the Contracting Officer's authorized representative may issue an order to stop all or any part of the work. When satisfactory corrective action is taken, an order to resume work will be issued. The Contractor shall not be entitled to any extension of time, nor to any claim for damage or to additional compensation by reason of either the directive or the stop order. Failure of the Contracting Officer or the Contracting Officer's representative to order discontinuance of any or all of the Contractor's operations shall not relieve the Contractor of the Contractor's responsibility for the safety of personnel and property.

f. The Contractor shall maintain an accurate record of, and shall report to the Contracting Officer's authorized representative in the manner prescribed by the Contracting Officer, all cases of death, occupational diseases, or traumatic injury to employees or the public involved, and property damage in excess of \$2,500 per incident to performance of work under this contract.

g. The rights and remedies of the Government provided in this paragraph are in addition to any other rights and remedies provided by law or under this contract.

h. In the event there is a conflict between the requirements contained in Reclamation's "Reclamation Safety and Health Standards," specifications paragraphs, Contractor's approved safety program, referenced safety and health codes and standards, or the U.S. Department of Labor Construction Safety and Health Standards, promulgated under section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 327 et seq.), as amended, the more stringent requirement will prevail.

i. The cost of complying with this paragraph shall be included in the prices bid in the schedule for other items of work.

1.4.2. Submission of Material Safety Data Sheets for Hazardous Materials

After award of contract, the Contractor shall submit updated List of Hazardous Materials (LHM) and Material Safety Data Sheets (MSDS) in accordance with the requirements of paragraph (e) of the clause at FAR 52.223-3, "Hazardous Materials Identification and Safety Data".

The Contractor shall submit the updated LHM and completed MSDS and identification and certification for each material to the Bureau of Reclamation, Construction Engineer, P.O. Box 60400, Boulder City NV 89006-0400. The Contractor shall not deliver any hazardous material to the jobsite which was not included on the original LHM prior to acceptance of the Contractor's MSDS by the Construction Engineer.

The cost of complying with this paragraph shall be included in the applicable prices offered in the schedule for the items of work for which the hazardous materials are required.

SECTION 1.5--ENVIRONMENTAL QUALITY PROTECTION

1.5.1. Prevention of Water Pollution

a. General.--The Contractor's construction activities shall be performed by methods that will prevent entrance, or accidental spillage, of solid matter, contaminants, debris, or other pollutants or wastes into streams, flowing or dry watercourses, lakes, wetlands, reservoirs, or underground water sources. Such pollutants and wastes include, but are not restricted to, refuse, garbage, cement, concrete, sanitary waste, industrial waste, radioactive substances, oil and other petroleum products, aggregate processing tailings, mineral salts, and thermal pollution.

Excavated materials or other construction materials shall not be stockpiled or deposited near or on streambanks, lake shorelines, or other watercourse perimeters where they can be washed away by high water or storm runoff, or can in any way encroach upon the watercourse itself.

The Contractor shall not discharge anything but clear water into the Hoover Dam drainage system.

The Contractor shall also comply with the sanitation and potable water requirements of section 7 of Reclamation's "Reclamation Safety and Health Standards."

b. Laws, regulations, and permits.--The Contractor shall comply with applicable Federal and State laws, orders, regulations, and water-quality standards concerning the control and abatement of water pollution and in the event there is a conflict between State and Federal laws, regulations, and requirements, the most stringent shall apply. Consistent violations of applicable Federal or State laws, orders, regulations, or water-quality standards shall result in the Contracting Officer stopping all site activity until compliance is assured. The Contractor shall not be entitled to any extension of time, claim for damage, or additional compensation by reason of such a work stoppage. Corrective measures required to bring activities into compliance shall be at the Contractor's expense.

c. Cost.--Except as specified above, the cost of complying with this paragraph shall be included in the prices offered in the schedule for other items of work.

1.5.2. Abatement of Air Pollution

a. General.--The Contractor shall comply with applicable Federal, State, and local laws and regulations, and with the requirements of this paragraph concerning the prevention and control of air pollution. Should a conflict exist in the requirements for abatement of air pollution, the most stringent requirement shall apply. The Contractor shall utilize such methods and devices as are reasonably available to prevent, control, and otherwise minimize atmospheric emissions or discharges of air contaminants.

Equipment and vehicles that show excessive emissions of exhaust gases shall not be operated until corrective repairs or adjustments reduce such emissions to acceptable levels.

b. Cost.--The cost of complying with this paragraph shall be included in the prices offered in the schedule for other items of work.

1.5.3. Noise Abatement

a. General.--The Contractor shall comply with applicable Federal, State, and local laws and regulations, with applicable requirements of Reclamation's "**Reclamation Safety and Health Standards**" and with the requirements of this paragraph regarding the prevention, control, and abatement of harmful noise levels. Should a conflict exist in the requirements for noise abatement, the most stringent requirement shall apply.

b. Cost.--The cost of complying with this paragraph shall be included in the prices offered in the schedule for other items of work.

1.5.4. Cleanup and Disposal of Waste Materials

a. General.--The Contractor shall be responsible for the cleanup and disposal of waste materials and rubbish. The disposal of waste materials and rubbish shall be in accordance with applicable Federal, State, and local laws and regulations, with applicable requirements of Reclamation's "**Reclamation Safety and Health Standards**," and with the requirements of this paragraph. Should a conflict exist in the requirements for cleanup and disposal of waste materials, the most stringent requirement shall apply.

The Contractor shall keep records of the types and amounts of waste materials produced, and of the disposal of all waste materials on or off the job site.

In the event of the Contractor's failure to perform the work required by this paragraph, the work may be performed by the Government, and the Contractor will be backcharged for the cost of such work. The Contractor's surety or sureties shall be liable for such payment until received by the Government.

b. Cleanup.--In accordance with clause 52.236-12 entitled "Cleaning Up," the Contractor shall keep work and storage areas free from accumulations of

waste materials and rubbish, and before completing the work, shall remove all plant facilities, buildings, including concrete footings and slabs, rubbish, unused materials, concrete forms, and other like materials, which are not a part of the permanent work.

Upon completion of the work, and following removal of construction facilities and required cleanup, work areas shall be regraded and left in a neat manner conforming to the natural appearance of the landscape.

c. Disposal of hazardous waste and materials.--Hazardous waste, as defined by 40 CFR 261.3; and hazardous materials, as defined by Federal Standard No. 313, as amended; or other Federal, State, or local laws or regulations, used by the Contractor or discovered in work or storage areas, shall be disposed of in accordance with these specifications and applicable Federal, State, and local laws and regulations. Waste materials that may be hazardous shall be tested, and the test results shall be submitted to the Contracting Officer for review.

Waste materials known or found to be hazardous shall be disposed of in approved treatment or disposal facilities. Hazardous wastes shall be recycled whenever possible. A copy of the hazardous waste manifest shall be sent to the Contracting Officer.

Waste materials discovered at the construction site shall immediately be reported to the Contracting Officer. If the waste may be hazardous, the Contracting Officer may order delays in the time of performance or changes in the work, or both. If such delays or changes are ordered, an equitable adjustment will be made in the contract in accordance with the applicable clauses of the contract.

d. Disposal of other waste materials.--

(1) General.--Waste materials including, but not restricted to, refuse, garbage, sanitary wastes, industrial wastes, and oil and other petroleum products, shall be disposed of by the Contractor.

(2) Disposal by removal.--Waste materials to be disposed of by removal from the construction area shall be removed prior to completion of the work under these specifications. All materials removed shall become the property of the Contractor.

Where waste materials are to be dumped, they shall be dumped only at an approved dump. The Contractor shall make any necessary arrangements with private parties and county officials pertinent to locations and regulations of such dumping, and shall pay any fees or charges required for such dumping.

e. Cost.--Except as provided above, the cost of cleanup and disposal of waste materials in accordance with this paragraph shall be included in the prices offered in the schedule for other items of work.

DIVISION 2--SITEWORK

SECTION 2.1--SITEWORK, GENERAL

2.1.1. General Sitework Requirements

Sitework under these specifications consists of furnishing all materials and performing all work required for replacing metal stairways and drain covers with fiberglass reinforced plastic (FRP) stairways and drain covers. Sitework shall be performed as shown on the drawings and herein specified.

2.1.2. Work Sequence

The Contractor shall sequence his work in such a way as to ensure maximum safety for the Contractor's employees, and minimize the risk of damage to new stairways and drain covers and existing items which are to remain in place.

The work shall be scheduled with the following constraints:

- a. The Contractor shall sequence construction operations to allow the Government continuous accessibility to the upper and lower connecting galleries, at elevations 975.00 and 674.00, respectively, from either the Arizona or Nevada side of the dam.

SECTION 2.2--DEMOLITION

2.2.1. Removal of Existing Facilities

- a. Existing features to be removed by the Contractor include the following:

- (1) Approximately 490 feet of existing steel inclined stairways, including all treads, handrails, handrail posts, railing connections--except where specified on Drawing No. 5 (45-300-1100)--brackets, fittings, grounding conductor, and appurtenant items. There are a total of six inclined stairways to be removed--Nos. 5, 7, 9, 12, 19, and 21--and are located between elevations 975.00 and 674.00.

- (2) Approximately 250 feet of existing steel drain covers. The drain covers are located in spiral stairway shafts 6, 8, 10, 11, and 20.

- b. In removing the existing facilities, no framing or structural member shall be cut or removed without the approval of the Contracting Officer. Anchor bolts or other items projecting from concrete which are required to be removed shall be cut flush with concrete surface. Any damages caused by the Contractor shall be repaired at no cost to the Government and in a manner satisfactory to the Contracting Officer.

All removal operations for existing facilities which might endanger the new construction shall be performed prior to the construction of new facilities. No equipment or devices shall be used in removal operations which might damage existing structures, utilities or facilities which are to remain in place.

Demolition shall proceed in an orderly and careful manner. Cleanup shall proceed along with demolition so that debris does not accumulate in the

work areas. The Contractor's demolition operations shall be sequenced around the constraints specified in Paragraph 2.1.2. (Work Sequence).

All materials removed by the Contractor shall become the property of the Contractor and shall be disposed of in accordance with Paragraph 1.5.4. (Cleanup and Disposal of Waste Materials).

The Contractor will have limited use of elevators for removal of debris and for bringing in new construction materials.

c. Payment.--Payment for demolition of existing inclined stairways and drain covers will be made at the applicable lump sum prices bid therefor in the schedule.

SECTION 2.3--REPLACEMENT

2.3.1. Replacement, General

The existing steel inclined stairways, and drain covers shall be replaced with new inclined stairways and drain covers.

The Contractor shall furnish all materials required and shall install the new FRP inclined stairways and drain covers in a workmanlike manner as shown on the drawings and specified in the applicable sections of these specifications.

The Contractor shall submit all drawings and data required for new stairways and drain covers as required in DIVISION 3--FIBERGLASS REINFORCED PLASTIC.

All materials necessary for the installation of new stairways and drain covers shall be furnished and installed by the Contractor whether or not the required materials are shown on the drawings or specifically mentioned in these specifications. The Contractor's installation procedures shall be subject to the approval of the Contracting Officer.

2.3.2. Installation

a. General.--Replacement features to be installed by the Contractor include the following:

(1) Approximately 490 feet of new FRP inclined stairways, including all treads, handrails, handrail posts, railing connections, appurtenant parts, and stainless steel fasteners and expansion anchors. There are a total of six new stairways to be installed--Nos. 5, 7, 9, 12, 19, and 21--and are to be installed in kind where the existing stairways are to be removed.

The centerlines of the new FRP inclined stairways shall match those of the existing inclined stairways.

(2) Approximately 250 feet of new FRP drain covers which are to be replaced in kind where the existing drain covers are to be removed in spiral stairway shafts 6, 8, 10, 11, and 20.

All cut edges and drilled holes as well as any scratches or gouges, if not rejected by the Contracting Officer, made on FRP during installation shall be resin sealed.

b. Payment.--Payment for furnishing and installing new inclined stairways and drain covers will be included in the applicable lump sum price bid therefor in the schedule.

DIVISION 3--FIBERGLASS REINFORCED PLASTIC (FRP)

SECTION 3.1--FRP STAIRWAYS

3.1.1. FRP Inclined Stairways

a. General.--The Contractor shall furnish all materials and fabricate and install the FRP inclined stairways, including all FRP structural shapes, FRP handrailing, FRP grating and nosing, expansion anchors, bolts, nuts, washers, and other materials required for the complete installation of the inclined stairways as herein specified and as shown on Drawing Nos. 15 (45-300-1110) through 24 (45-300-1119).

b. Submittals.--The Contractor shall submit the material data and drawings listed below in accordance with the provisions of Paragraph 1.1.4. (Submittal Requirements).

c. Materials.--

(1) FRP structural members--All FRP structural members and plates shall be from a single manufacturer. All FRP shall be "Pultex" as manufactured by Creative Pultrusions, Inc., Pleasantville Industrial Park, Alum Bank, PA 15521; or "Extren" as manufactured by the Morrison Molded Fiber Glass Co., 400 Commonwealth Ave., P.O. Box 580, Bristol, VA 24203-0580, or equal, having the following salient characteristics:

(a) FRP structural members and plates shall be pultruded fiberglass reinforced plastic and shall be manufacturer's standard gray in color. The resin system shall be a fire retardant polyester with a maximum flame spread rating of 25 tested in accordance with ASTM E 84.

(b) All FRP shall have minimum longitudinal compressive, tensile, and flexural strengths of 30,000 psi tested in accordance with ASTM D 695, D 638, and D 790, respectively. Minimum longitudinal short beam shear strength shall be 4,500 psi tested in accordance with ASTM D 2344. In the transverse direction, minimum properties are: compressive strength of 15,000 psi, ASTM D 695; tensile strength of 7,000 psi, ASTM D 638; flexural strength of 10,000 psi, ASTM D 790; shear strength of 5,500 psi, ASTM D 732 or ASTM D 3846. FRP shall have a minimum modulus of elasticity of 2,500,000 psi.

(2) FRP gratings and nosings.--All FRP gratings and nosings shall be from a single manufacturer. FRP grating and nosing systems shall be "Safe-T-Grate" as manufactured by Seasafe, Inc., 209 Glaser Drive, Lafayette, LA 70508; or "Duradek" as manufactured by the Morrison Molded Fiber Glass Co., 400 Commonwealth Ave., P.O. Box 580, Bristol, VA 24203-0580; or equal, having the following salient characteristics:

(a) FRP grating and nosing shall be pultruded fiberglass reinforced plastic and shall be manufacturer's standard yellow in color. The resin system shall be a fire retardant polyester with a maximum flame spread rating of 25 tested in accordance with ASTM E 84.

(b) FRP grating shall have a 2-part mechanical locking cross-rod system covered by a baked on safety, non-skid epoxy grit. Grating shall have a bearing bar depth of 1 inch. Grating shall be able to carry a uniform load of 500 lbs/sq. ft. on a simple span of 27 inches and not deflect more than .25 inches. FRP nosing shall have a depth of 1 inch. Nosing shall be covered by a baked on safety, non-skid epoxy grit.

(3) Expansion anchors.--Federal Specification FF-S-325, group II, type 4, class 1. Where the length of bolt is not indicated, the bolt length shall provide a 3½-inch minimum embedment. Expansion anchors, including nuts and washers shall be 300 series stainless steel. At the Contractor's option, 400 series nuts may be used to minimize the risk of seizing when tightening nuts onto anchors.

(4) Bolts.--300 series stainless steel, ASTM F 593.

(5) Nuts.--300 series stainless steel, ASTM F 594. At the Contractor's option, 400 series nuts may be used to minimize the risk of seizing when tightening nuts onto bolts.

(6) Washers.--300 series stainless steel.

(7) Roll pins.--300 series stainless steel.

(8) Grating fasteners (saddle clips).--300 series stainless steel.

(9) Hinges, latches, and collars for FRP safety gates.--300 series stainless steel, of good commercial quality and suitable for intended use.

(10) Miscellaneous metalwork.--Angle brackets and all other metalwork not specifically covered herein shall be 300 series stainless steel, of good commercial quality and suitable for intended use.

(11) Adhesive.--Epoxy adhesive for bonding and sealing FRP shall be in accordance with the recommendations of the manufacturer of the FRP.

d. Drawings.--

(1) FRP Safety Gates.--Submit shop drawings for safety gates.

(2) Government specifications drawings to be revised and corrected ("as-built").--One full-size print of the specifications drawings furnished to the Contractor for "as-built" construction purposes shall be marked to show any changes and additions made during construction. Markings shall be red for additions and green for deletions.

e. Fabrication.--

(1) General.--Prior to fabrication, the Contractor shall verify dimensions shown on the drawings. If discrepancies are found, the Contractor shall notify the Contracting Officer before fabrication. All work shall be equal to the best modern practice in the manufacture and fabrication of materials of the types covered by this specification

paragraph, notwithstanding any omissions from these specifications or applicable drawings. Material shall be straight, true, square cut free of burrs and shall be finished as shown on the drawings. Holes and slots shall be perpendicular to the members and clean cut and without burred or ragged edges.

Fabrication of the FRP shall be done in such a way to prevent attack from corrosive agents. Any scratches or gouges, if not rejected by the Contracting Officer, as well as all cut edges or drilled holes shall be resin sealed to prevent excessive attack of the laminate. The criteria for acceptance/rejection due to wrinkling, crazing, and other defects for all FRP shall be subject to the provisions of ASTM D 2563. Minimum acceptance level for all FRP will be Level III.

(2) Handrailing.--All handrailing shall be fabricated with standard FRP structural tubing, solid plugs, solid spacers with drilled holes, plate, and with 300 series stainless steel hardware. All handrailings shall be finished smooth.

(3) Safety gates.--Safety gates shall be fabricated with standard FRP structural tubing and solid plugs with 300 series stainless steel hinges, latches, collars, and hardware. Gates shall open to the downslope direction of travel and shall be self-closing. Latching mechanism shall be easily accessible from either the upslope or downslope sides.

(4) Stringers 8a, 9a, and 16a shall be assembled with their respective sub-stringers and gussets at the construction site.

f. Installation.--

(1) General.--The Contractor shall erect all FRP inclined stairways as shown on the drawings. The Contractor shall drill all holes in concrete required for the installation of expansion anchors. Prior to installing new FRP stairways, Contractor shall ensure existing concrete surfaces where new parts are to be mounted are clean and smooth.

The Contractor shall slot cut, or drill FRP in the field as required for installation. Any scratches or gouges, if not rejected by the Contracting Officer, as well as all cut edges or drilled holes in the FRP shall be resin sealed to prevent excessive attack of the laminate.

(2) Railing connections.--Railing connections are to be attached to the existing gallery walls and to railing braces and corner posts where shown on the drawings. Railing braces are to be installed between the top and bottom handrails located approximately midway between every handrail post, including the handrails between top, intermediate, and bottom stringers (not between sub-stringers).

(3) Existing utility lines.--Existing utility lines are mounted on the reservoir-side walls in some of the abutment galleries. Attach railing connections to railing braces and walls so that connections are clear of the lines. Exact positions of the railing connections will be determined in the field.

(4) Stairway centerlines, stringer lengths, and mark numbers.-- Stairway centerlines and stringer lengths of all new stairways shown on the drawings match those of the existing stairways. With the exception of Stairways 14 and 17, the outside width of the new stairways is the same as the existing stairways. To the extent possible, new stringers and treads shown on the drawings match their existing counterparts and are related by the mark number (which is the same for both) followed by the letters "A" or "a".

g. Payment.--Payment for submitting material data and shop drawings, and for fabricating, furnishing, and installing all components of the FRP inclined stairways will be made at the lump sum price offered therefor in the schedule for furnishing and installing FRP inclined stairways.

SECTION 3.2--FRP DRAIN COVERS

3.2.1. FRP Drain Covers

a. General.--The Contractor shall furnish all materials and fabricate and install the FRP drain covers in the spiral stairway shafts as herein specified and as shown on Drawing No. 25 (45-300-1120).

b. Submittals.--The Contractor shall submit the material data, test reports, and drawings listed below in accordance with the provisions of Paragraph 1.1.4. (Submittal Requirements).

c. Materials.--

(1) Hand-laminated FRP--All new drain covers shall be hand-laminated FRP. All FRP drain covers shall be fabricated from a single fabricator. All laminated FRP shall have the following characteristics:

(a) Laminated FRP shall have the required layers of fiberglass mat and roving to meet the minimum mechanical properties listed in subparagraph (b), below. Laminated FRP shall be pultruded fiberglass reinforced plastic and shall be manufacturer's standard gray in color. The resin system shall be a fire retardant polyester with a maximum flame spread rating of 25 tested in accordance with ASTM E 84.

(b) All laminated FRP shall have minimum longitudinal compressive, tensile, and flexural strengths of 30,000 psi tested in accordance with ASTM D 695, D 638, and D 790, respectively. Minimum longitudinal short beam shear strength shall be 4,500 psi tested in accordance with ASTM D 2344. In the transverse direction, minimum properties are: compressive strength of 15,000 psi, ASTM D 695; tensile strength of 7,000 psi, ASTM D 638; flexural strength of 10,000 psi, ASTM D 790; shear strength of 5,500 psi, ASTM D 732 or ASTM D 3846. FRP shall have a minimum modulus of elasticity of 2,500,000 psi.

(2) Neoprene gaskets.--

(a) 1/4-inch thick.

(b) Hardness.--ASTM D 2240 or Federal Test Method Standard No. 601, Method 3021: Type A durometer reading of 55 to 65.

(3) Non-expanding resin anchors.--Shall be "UPAT" Capsule Anchors as manufactured by Wej-it Corp., 2415 E. 13th Place, Tulsa OK 74152; or "HVA" Adhesive Anchors as manufactured by Hilti, Inc., P.O. Box 21148, Tulsa OK 74121, or equal, having the following salient characteristics:

(a) A two-part threaded anchor, including nut and washer, and sealed-glass capsule system. Anchors shall be 300 series stainless steel. At the Contractor's option, 400 series nuts may be used to minimize the risk of seizing when tightening nuts onto anchors. The capsule shall contain a premeasured amount of epoxy resin, aggregate, and hardening agent.

(4) Adhesives.--

(a) Adhesive for bonding and sealing FRP shall be in accordance with the recommendations of the manufacturer or fabricator of the FRP.

(b) Adhesive and for bonding neoprene gaskets to FRP shall be in accordance with the recommendations of the manufacturer of the neoprene gaskets.

d. Certified test reports.--Certified test reports shall be submitted for the cast FRP in accordance with the tests specified in subparagraph 3.2.1.c.(1), above.

e. Drawings.--

(1) Government specifications drawings to be revised and corrected ("as-built").--One full-size print of the specifications drawings furnished to the Contractor for "as-built" construction purposes shall be marked to show any changes and additions made during construction. Markings shall be red for additions and green for deletions.

f. Fabrication.--

(1) General.--Prior to fabrication, the Contractor shall verify dimensions shown on the drawings. If discrepancies are found, the Contractor shall notify the Contracting Officer before fabrication. All work shall be equal to the best modern practice in the manufacture and fabrication of materials of the types covered by this specification paragraph, notwithstanding any omissions from these specifications or applicable drawing. Material shall be straight, true, square cut free of burrs and shall be finished as shown on the drawings. All holes shall be cylindrical, perpendicular to the members, and clean cut and without burred or ragged edges.

Fabrication of the FRP shall be done in such a way to prevent attack from corrosive agents. Any scratches or gouges, if not rejected by the Contracting Officer, as well as all cut edges or drilled holes shall be resin sealed to prevent excessive attack of the laminate. The criteria for acceptance/rejection due to wrinkling, crazing, and other defects for all FRP shall be subject to the provisions of ASTM D 2563. Minimum acceptance level for all FRP will be Level III.

For those drain covers which require laps, the lap may either be laminated to drain covers as a single unit, or bonded to drain cover with adhesive after laminating in which case a watertight connection must be achieved. Except for FRP surfaces where bonding to neoprene gaskets is required, all FRP surface finishes shall be smooth.

(2) Neoprene gaskets.--After laminating drain covers, neoprene gaskets shall be adhered to the FRP drain covers with adhesive and have a watertight fit. Follow adhesive manufacturer's instructions.

g. Installation.--

(1) General.--The Contractor shall erect all FRP drain covers as shown on the drawing. The Contractor shall drill all holes in concrete required for the installation of non-expanding resin anchors. Prior to installing new FRP drain covers, Contractor shall ensure existing concrete surfaces where new parts are to be placed are clean and smooth.

The Contractor shall slot cut, or drill FRP in the field as required for installation. Any scratches or gouges, if not rejected by the Contracting Officer, as well as all cut edges or drilled holes in the FRP shall be resin sealed to prevent excessive attack of the laminate.

After drilling holes for resin anchors, ensure holes are free of grit, dust and standing water by blowing out with compressed air prior to installing anchors.

Follow manufacturer's instructions for applying epoxy adhesive. Ensure adequate ventilation when applying epoxy. Allow epoxy to fully cure in anchors before applying required full-load torque for final placement of drain covers.

(2) Watertight connections.--All connections between drain covers, and between drain covers and existing concrete shall be watertight. Caulk if necessary to achieve watertight fit.

h. Payment.--Payment for submitting material data and test reports, and for fabricating, furnishing, and installing all components of the FRP drain covers will be made at the lump sum price bid therefor in the schedule for furnishing and installing FRP drain covers.

DIVISION 4 -- DRAWINGS

SECTION 4.1 --DRAWINGS

4.1.1. Drawings, General

a. General.--In the event there are minor differences as determined by the Contracting Officer between details and dimensions shown on the drawings and those of existing features at the site, the details and dimensions of existing features at the site shall govern.

The Contractor shall check all drawings carefully and advise the Contracting Officer of any errors or omissions discovered.

b. Additional or revised drawings.--Except as otherwise provided in these specifications for drawings to be furnished by the Contractor, the specifications drawings will be supplemented by such additional or revised general and detail drawings as may be necessary or desirable as the work progresses; and the Contractor shall do no work without proper drawings and instructions. The Contractor will be required to perform the work in accordance with the additional general and detail drawings or revisions furnished by the Government at the applicable prices offered in the schedule.

c. Additional copies of drawings.--The Contractor will be furnished such additional copies of the specifications and drawings as may be required for carrying out the work.

d. Mailing address.--All drawings and data submitted by the Contractor for which a specific mailing address is not given in these specifications shall be submitted to the Construction Engineer, Bureau of Reclamation, P.O. Box 60400, Boulder City, Nevada 89006-0400.

4.1.2. List of Drawings

The following drawings are made a part of the technical specifications:

REPLACING METAL STAIRWAYS
AND DRAIN COVERS WITH FRP
BOULDER CANYON PROJECT
HOOVER DAM
ARIZONA-NEVADA

DESIGN DRAWINGS

- | | | |
|----|-------------|--|
| 1. | 45-300-1096 | Location Map |
| 2. | 45-300-1097 | Galleries and Shafts, Upstream Elevation |
| 3. | 45-300-1098 | Plan of Galleries and Shafts |
| 4. | 45-300-1099 | Galleries and Shafts, Sections |

EXISTING FACILITIES

- | | | |
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| 5. | 45-300-1100 | Existing Stairways - Anchor Locations |
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- 6. 45-300-1101 Existing Stairways - Anchor Locations, Stringer Details, Tread and Stringer Distribution Table
- 7. 45-300-1102 Existing Stairways - Stringer Details and Stairway Assemblies
- 8. 45-300-1103 Existing Stairways - Stringer Details and Stairway Assemblies
- 9. 45-300-1104 Existing Stairways - Stairway Assemblies
- 10. 45-300-1105 Existing Stairways - Railings, Posts, Miscellaneous Parts, and Distribution Table

NEW STAIRWAYS, DRAIN COVERS

- 11. 45-300-1110 Stringer Expansion Anchor Locations - New Stairways 19, and 21
- 12. 45-300-1111 Stringer Expansion Anchor Locations - New Stairways 5, 7, and 9
- 13. 45-300-1112 Stringer Expansion Anchor Locations - New Stairway Distribution Table for Treads and Stringers
- 14. 45-300-1113 Assemblies - New Stairways 5, 7, 9, 12
- 15. 45-300-1114 Assemblies - New Stairways 19, and 21
- 16. 45-300-1115 New Stairways - Railings, Posts, Connections, Safety Gates, Installation Details and Sections
- 17. 45-300-1116 New Stairways - Tread Assemblies, Typical Stair Installation
- 18. 45-300-1117 New Stringers 8a, 9a
- 19. 45-300-1118 New Stringers 11a and 17a
- 20. 45-300-1119 New Stringers 12a, 14a, and 18a
- 21. 45-300-1120 New Drain Covers - Installation and Details

INFORMATION DRAWINGS

- 22. 45-D-4621 Abutment Galleries - Steel Stairways Stringers 23 and 24; Treads Assemblies; Stairway Nos. 24 and 26

4.1.3. Drawing Numbers in Numerical Order

Drawing	Sheet No.
45-300-	
45-300-1096	1
45-300-1097	2
45-300-1098	3
45-300-1099	4
45-300-1100	5
45-300-1101	6
45-300-1102	7
45-300-1103	8
45-300-1104	9
45-300-1105	10
45-300-1110	11
45-300-1111	12
45-300-1112	13
45-300-1113	14
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45-300-1118	19
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45-300-1120	21
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